

PATENT SPECIFICATION

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(54) CLOSURE DEVICE

(71) I, KURT ALTEN of 14, Ringstrasse, D-3015 Wennigsen, German (Fed. Rep.); a German national, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates generally to a roller gate, door or blind of the type which has a closure member which can be rolled up and unwound to uncover and cover an aperture, a winding bracket being provided above the aperture to receive the wound-up closure member.

It is known to effect such winding and unwinding electrically and to associate limit switches with the closure members to interrupt the current supply therefor. The electrical leads leading to the limit switch are located on at least one lateral edge of the closure member and are moved up and down therewith.

The present invention seeks to provide a closure member of the above type but in which the electrical connection of the leads is simplified and direct switching of the winding-up bracket or the associated electric motor is possible. At the same time, the invention seeks to provide an arrangement in which the electrical leads are capable of being connected to, and forming part of, a burglar alarm device.

According to the present invention, there is provided a closure device in the form of a roller gate, door or blind comprising a closure member adapted to be wound-up and unwound to uncover and cover an aperture respectively and an electrical drive motor for effecting such winding and unwinding, the closure member having a winding-up bracket associated therewith which is, in use, located above the aperture wherein the closure member is in the form of a continuous, flexible panel having electric conductors embedded therein, which conductors are electric-

cally connectable to terminals located on the winding-up bracket and extend to the lower end of the closure member, the conductors being connected at their lower ends to limit switches controlling the drive motor.

A device in accordance with the present invention therefore includes a continuous closure member in which a plurality of electric conductors are embedded over substantially their entire length. These conductors may thus be laid from the lower edge of the closure member to the top to the winding-up bracket. Hence it is not necessary to provide variable length conductors along the lateral edge or edges of the closure members.

Moreover, by embedding the conductors directly in the closure member, monitoring of the closure device is made possible. The conductors may be constantly live when installed and, when the closure member is damaged to such an extent that at least one of the conductors is broken such breakage may actuate a warning circuit or trigger off an alarm device.

The present invention will be further described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a fragmentary view of a closure member in the form of a roller-gate as would be seen from the interior of an aperture closed by the gate,

Fig. 2 is a section taken along the line II - II of Fig. 1 and

Figs 3 to 5 each show fragmentary cross-sectional views of parts of such a closure member, the views showing different ways of embedding an electrical conductor therein.

In Fig. 1 there is shown a building 1 having an aperture 2 therein which is to be closed. Above the aperture 2, a winding-up bracket 3 is rotatably mounted about a horizontal axis 3. The axis 3 is mounted in two bearings 4, 5 and an electrical drive motor 6 provides the power for rotating the axis. A winding member 7, in the form of a cylinder, rotates

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with the axis 3 and has the upper edge 9 of a closure member 8 secured thereto. On either side of the closure member 8, guides 10 are provided in which the lateral edges of the member 7 slide. To the bottom edges 11 of the closure member 8, a ledge or bar 12 is secured, which bar may be resiliently deformable. Electrical switches 14 are located in the region of the bar 12 which are actuated when the bar 12 touches the ground 13 or any other obstacle. The actuation of these switches 14 causes the motor 6 to be switched off in a known manner. It is, of course, to be understood, that limit switches 15 may be provided for determining the upper limit position of the closure member 8 in its wound-up state, which switches may be electrically connectable to the switches 14.

The closure member 8 is a flexible panel made of a soft, pliable PVC and may have cover sheets provided thereover. The member 8 is continuous and unlike roller gates made from laminae, is not regularly recessed or formed in sections. The continuous closure member 8 receives electrical conductors 15 which extend to the upper edge 9 of the member 8.

The conductors 15 may be embedded in the member 8 as shown in Fig. 3, 4 or 5. In all of these Figures, grooves 16 are provided into which the conductors 15 are inserted. In Figs. 3 and 4, the conductors are inserted in an uninsulated form and are thereafter insulated. As shown in Fig. 3, the insulation is effected by covering the groove with a further panel 17, preferably made of the same material as the closure member 8, the two panels 8, 17 then being welded together. In the embodiment shown in Fig. 4, after the insertion of the conductor 16 into the groove a suitable plastics material is charged into the groove. In the embodiment shown in Fig. 5, the conductor 15 is insulated prior to insertion into the groove 16, and is secured in the groove by cementing. The insulation in Fig. 5 is denoted by the reference numeral 18.

The ends of the conductors at the edge 9 of the member 8 are connected to electrical terminals 19, which terminals are connected electrically through the cylinder 7 by coiled connecting wires 20 to a switch box or boxes 21. The box or boxes 21 are optional but if present, may influence the switch members for the drive motor 6. The coiled connecting wires 20 obviate the need for slip rings or the like to permit current conduction from the rotating cylinder 7 to fixed connecting armatures.

Some conductors 15 are connected to the drive motor 6, whilst others act as fuses for the closure device. For this reason, they are not laid in a straight line from bottom to top of the closure member. The reason for this is to prevent a conductor 15 from being damaged or destroyed at any point by an un-

sired deformation or destruction of the closure member 8. The conductors 15 located centrally on the closure member 8 lead to separate connections 22 which, by connecting wires, not shown, are connected to switch boxes. The conductors 15 acting as fuses are live under normal conditions. If they become damaged, the circuit is interrupted and an alarm device is actuated. These devices and conductors are of optional design. The alarm devices may become actuated when the conductors 15 are influenced by induction. Such an arrangement does, of course, necessitate corresponding oscillatory circuits.

In all embodiments, it is important that the conductors 15 are protected within the flexible panel used as the closure member.

WHAT I CLAIM IS:

1. A closure device in the form of a roller gate, door or blind comprising a closure member adapted to be wound-up and unwound to uncover and cover an aperture respectively and an electrical drive motor for effecting such winding and unwinding the closure member having a winding-up bracket associated therewith which is, in use, located above the aperture, wherein the closure member is in the form of a continuous, flexible panel having electric conductors embedded therein, which conductors are electrically connectable to terminals located on the winding-up bracket and extend to the lower end of the closure member, the conductors being connected at their lower ends to limit switches controlling the drive motor. 85
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2. A device as claimed in claim 1 wherein the conductors are distributed over a major proportion of the surface of the closure member. 105

3. A device as claimed in claim 1 or 2, wherein the winding-up device is hollow and electrical connecting wires extend from the terminals through the hollow winding-up device. 110

4. A device as claimed in any preceding claim wherein the rotating parts of the winding-up bracket are connected to fixed terminals by coiled connecting wires. 115

5. A device as claimed in any preceding claim wherein the electric conductors are located in grooves formed in the closure member. 120

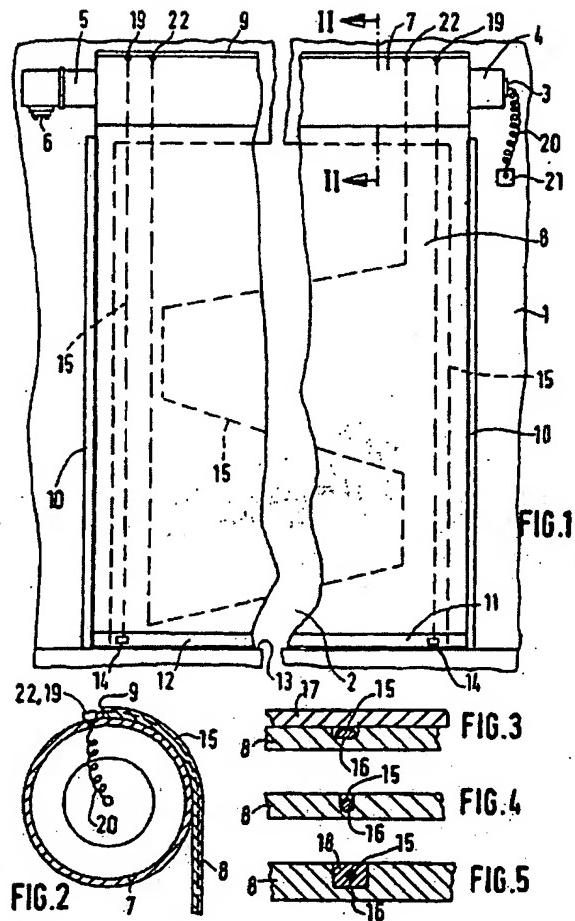
6. A device as claimed in any preceding claim wherein the electric conductors project beyond the edge of the closure member. 125

7. A closure device constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in Figs. 1, 2 and 3, 4 or 5 of the accompanying drawings.

For the Applicants
POTTS, KERR & CO.,
Chartered Patent Agents
15 Hamilton Square
Birkenhead
Merseyside L41 6BR.
and
27 Sheet Street
Windsor
Berkshire SL4 1BY.

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